

**Write the equation of the line tangent to
 $x^2 + y^2 = 25$ at $(3, -4)$**

Find the tangent and normal to the ellipse
 $x^2 - xy + y^2 = 7$ at the point $(-1, 2)$.

$$2x - \left(1(y) + x(1)\frac{dy}{dx} \right) + 2y \frac{dy}{dx} = 0$$

$$2x - y - x \frac{dy}{dx} + 2y \frac{dy}{dx} = 0$$

$$-x \frac{dy}{dx} + 2y \frac{dy}{dx} = -2x + y$$

$$\frac{dy}{dx} (-x + 2y) = -2x + y$$

$$\left. \frac{dy}{dx} \right|_{\substack{x=-1 \\ y=2}} = \frac{-2x+y}{-x+2y} = \frac{4}{5} = m$$

At what point(s) is the tangent to

$xy + 2x - y = 0$ parallel to $y = \frac{1}{2}x + 2$?

At what point(s) is the tangent to $y = 2e^{2x}$ parallel to $-x + y = 2$?

The position of a particle is $s(t) = 2 \sin 3t$.

At what times in $[0, 2\pi]$ is the particle moving upward?